WHAT WE CLAIM IS:

1. A process for impregnating wood or wood based material comprising the steps of:
   a. preheating a working solution to a temperature above the atmospheric boiling point ("a super hot temperature") of the working solution;
   b. contacting a wood or wood based material with the working solution at a said super hot temperature and at an elevated pressure such that the working solution is in the liquid phase, to cause impregnation of the liquid base solution into the wood or wood based material; and
   c. separating the wood or wood based material and any remaining working solution, waste material and/or by-products.

2. A process as claimed in claim 1 including applying sufficient pressure throughout the preheating step to ensure the working solution is maintained in the liquid phase.

3. A process as claimed in claim 1 or 2 including applying an initial pre-pressure to the wood or wood based material prior to contact with the working solution at the super hot temperature, sufficient to maintain the working solution in the liquid phase.

4. A process as claimed in claim 3 including applying the pre-pressure by a gas.

5. A process as claimed in claim 4 wherein the gas is selected from nitrogen, air, carbon dioxide, argon, acetic acid vapour or acetic anhydride vapour.

6. A process as claimed in any one of claims 3 to 5 including pre-pressurising the working solution to in the range of 10 to 1000 kPa.

7. A process as claimed in any one of claims 3 to 6 including pre-pressurising the working solution to in the range of 20 to 700 kPa.

8. A process as claimed in any one of claims 1 to 7 including assisting the impregnation of the solution into the wood or wood based material by applying a further hydraulic or pneumatic pressure (the 'working pressure').

9. A process as claimed in claim 8 including applying the working pressure in the range of 20 to 4000 kPa above the initial pre-pressure.

10. A process as claimed in claims 8 or 9 including applying the working pressure in the range of 20 to 2000 kPa above the initial pre-pressure.

11. A process as claimed in any one of claims 8 to 10 including applying the working pressure for less than about 240 minutes.

12. A process as claimed in any one of claims 8 to 10 including applying the working pressure for less than 120 minutes.

13. A process as claimed in any one of claims 8 to 10 including applying the working pressure for between about 1 and about 60 minutes.

14. A process as claimed in any one of the preceding claims including subsequent to the impregnation, releasing pressure to separate any remaining working solution, waste material and by-products (the 'pressure kickback').

15. A process as claimed in claim 14 including subsequent to separating the wood or wood based material and any remaining working solution, waste material and/or by-products, releasing pressure to separate the pressure kickback.

16. A process as claimed in any one of the preceding claims including applying a vacuum to separate any remaining working solution, waste material and/or by-products (the 'vacuum kickback').

17. A process as claimed in claim 16 including recycling the pressure kickback, the vacuum kickback or both for reuse as the working solution.

18. A process as claimed in claim 17 including adding further of said working solution to the recycled working solution and reusing same.

19. A process as claimed in any one of the preceding claims wherein the boiling point of the reaction by-products is lower than the boiling point of the working solution.

20. A process as claimed in any one of the preceding claims wherein the wood or wood based material is selected from one or more of solid wood, fibreboard, particle board, wood veneer, wood chips, oriented strand board, laminated veneer board and plywood.

21. A process according to any one of the preceding claims including when carried out in a plant comprising:

a. a first pressure vessel for initially containing and preheating the working solution; and

b. a second pressure vessel for containing and contacting the wood or wood based material with the working solution.

22. A process as claimed in claim 21 wherein said plant also includes a third pressure vessel as a reservoir for unreacted working solution, waste material and/or by-products, said third pressure vessel communicating with said second pressure vessel.

23. A process as claimed in any one of the preceding claims including pre-heating the working solution to above about 10 °C above the atmospheric pressure boiling point of the working solution.

24. A process as claimed in claim 23 including pre-heating the working solution to in the range of 150 to 250 °C.

25. A process as claimed in claim 24 including pre-heating the working solution to in the range of 160 to 220 °C.

26. A process as claimed in claim 25 including pre-heating the working solution to in the range of 170 to 200 °C.

27. A process as claimed in any one of the preceding claims wherein the working solution is selected from any one or more of copper naphthenate, xylene, succinic acid and acetic anhydride.

28. A process as claimed in claim 27 wherein the working solution is acetic anhydride.

29. A process as claimed in any one of the preceding claims including combining the working solution with a solvent.

30. A process as claimed in claim 29 wherein the solvent is selected from any one or more of water, isopropanol, methylene chloride, xylene, xylene mixed with paraffin wax, and acetic anhydride.

31. A process for impregnating wood or wood based material comprising the steps of:

a. preheating a working solution to a temperature above the atmospheric boiling point ("a super hot temperature") of the working solution, at an elevated pressure sufficient to maintain the working solution in the liquid phase;

b. applying a pre-pressurise to a wood or wood based material prior to contact with the working solution at the super hot temperature, sufficient to maintain the working solution in the liquid phase;

c. contacting a wood or wood based material with the working solution at a said super hot temperature and a said elevated pressure to cause impregnation of the solution into the wood or wood based material;

d. applying further pressure (the 'working pressure') to assist the impregnation of the working solution into the wood or wood based material; and

e. separating the wood or wood based material and any remaining working solution, waste material and/or by-products.

f. reducing the pressure to remove any further working solution, waste material and/or by-products.

32. A process for impregnating wood or wood based material comprising the steps of:

a. preheating a working solution to a temperature above the atmospheric boiling point ("a super hot temperature") of the working solution, at an elevated pressure sufficient to maintain the working solution in the liquid phase;

b. contacting a wood or wood based material with the working solution at a said super hot temperature and a said elevated pressure to cause impregnation of the solution into the wood or wood based material;

c. separating the wood or wood based material and any remaining working solution, waste material and/or by-products; and

d. recycling any separated working solution, waste material and/or by-products as the working solution.

33. An impregnated wood or wood based material produced according to a process of any one of the preceding claims.